



**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INFERENCES**

Application of:  
Ahrens, H. et al.

Serial No.: 09/914,942  
Int'l Application No.: PCT/EP00/01738  
Int'l Filing Date: 28 February, 2000  
Priority Date: 5 March, 1999

Title: ESTERQUATS, THEIR INTERMEDIATES,  
A PROCESS TO MAKE ESTERQUATS, AND  
THEIR USE

Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

: Docket No.: ACR 2691P1 US

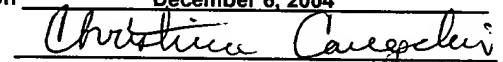
: Group Art Unit: 1751

: Examiner: Hardee, John R.

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**BRIEF ON APPEAL**

Respectfully submitted,



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Sir:

## I. INTRODUCTION

Pursuant to the provisions of 35 U.S.C. §134 and 37 C.F.R. §§1.191 and 1.192, this paper is submitted as a brief setting forth the authorities and arguments upon which Appellants rely in support of the Appeal from the Final Rejection of claims 1, 4-6, 8 and 14 entered in the above-identified patent application on April 26, 2004 and maintained in the Advisory Action mailed July 22, 2004.

## II. REAL PART IN INTEREST

The real part in interest in the present case is Akzo Nobel nv, Arnhem, The Netherlands.

### **III. RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences pending or anticipated involving the present application.

### **IV. STATUS OF THE CLAIMS**

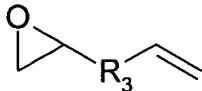
The present application was originally filed under the PCT as PCT/EP00/01738 on February 28, 2000. In the Preliminary Amendment filed on September 5, 2001, claim 11 was canceled and new claim 14 was added. Claims 2, 3, 7 and 13 were withdrawn in the Response filed March 18, 2004. Accordingly, claims 1, 4-6, 8 and 14 are pending herein on Appeal, and are reproduced in the Appendix to this Brief.

### **V. STATUS OF THE AMENDMENTS**

The present application was originally filed under the PCT as PCT/EP00/01738 on February 28, 2000. In the Preliminary Amendment filed on September 5, 2001, claim 11 was canceled and new claim 14 was added. Claims 2, 3, 7 and 13 were withdrawn in the Response filed March 18, 2004. All Amendments have been entered, including the Response filed June 30, 2004<sup>1</sup>.

### **VI. SUMMARY OF THE INVENTION**

The claimed invention generally relates to ester group-containing quaternary ammonium compounds, their intermediates, and to method of using them. The quaternary ammonium compounds and their intermediates are clearly depicted by applicants' claims.

The claimed process contemplates reacting an unsaturated epoxide of the  
formula  with an amine or protonated amine of the formula  $R_4[R_5R_6N]_n$  or

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<sup>1</sup> In this regard applicants note that the Examiner did not formally note whether the Response filed on June 30, 2004 was entered in the Advisory Action mailed on July 22, 2004. Accordingly, applicants assume that it was entered for purposes on Appeal.

$R_4[R_5R_6N^+H]_n X^-$ , wherein  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $n$ , and  $X^-$  have the meaning given in claim 1, and

- esterification of the intermediate with, on average, 1-2 moles of fatty acid derivatives, comprising the moieties  $R_1-C(O)-$ ,  $R_2-C(O)-$  or mixtures thereof, per mole of OH groups of the intermediate,
- an optional conventional quaternization either before or after said esterification step.

This process leads to the 2-hydroxy-3-butene derived compounds of the present invention, which have a very clear and significant advantage over the epichlorohydrin derived compounds of the prior art, i.e., **they are halogen free**. Additionally, the prior art fails to disclose or suggest such compounds, or their utility as fabric softeners, and, applicants submit, that one would NOT be able to conclude that the claimed quats would have the same properties as those of the prior art.

## **VII. ISSUES**

The issues remaining in the present case which require resolution herein on Appeal are summarized as follows:

(1) Are claims 1, 4-6, 8 and 14 obvious over the disclosure of over EP 330,261 ('EP261) under 35 U.S.C. § 103(a)?

Additionally, applicants note that the examiner did state that process claims 9 and 10 remain **objected to** as being dependent on a rejected base claim, but would be **allowable** if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

## **VIII. GROUPING OF CLAIMS**

Applicants respectfully submit that the pending claims do not stand and fall together. More specifically, the examiner indicated that process claims 9 and 10 are **objected to** as being dependent on a rejected base claim, but would be **allowable** if rewritten in independent form including all of the limitations of the base claim and any

intervening claims. Thus, there are no substantive issues relative to these claims. Additionally, applicants submit that by their nature, compound claims 1-6 stand and fall together, intermediate claim 7 stands and falls on its own, and each of claims 8 and 12-14 stands and falls on its own.

## **IX. ARGUMENT**

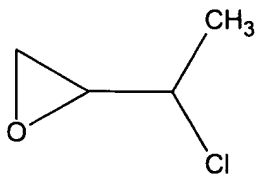
The Examiner has maintained the rejection of the present claims for allegedly being obvious over the disclosure of over EP 330,261 ('EP261) under 35 U.S.C. § 103(a). Appellants respectfully submit that such rejections are improper and cannot be maintained.

Initially, the Examiner has maintained that the ester quat according to formula II in claim 1 is a one-carbon homolog of the quaternary ammonium compound disclosed in EP 0 330 261, and that for this reason at least the ester quat of formula II is obvious thereover. Applicants respectfully disagree with the Examiner and submit that there are several reasons why one of ordinary skill in the art would not consider the claimed compounds to be obvious over the teachings of EP '261.

In the first instance, the Honorable Board is respectfully requested to note that the examiner is apparently requiring some comparative showing demonstrating the unexpectedly superior performance of the claimed compounds compared to the compounds of EP'261. Applicants submit that patentability of the present compounds is not based on a synergistic improvement in the fabric softening properties compared to the compounds of EP'261. Rather, a significant advantage of the class of esterquats according to the present invention is that they **can be manufactured without utilizing epichlorohydrins, an environmentally dangerous compound that is difficult to handle and dispose of**. Further, since **epichlorohydrins** are not employed, there is no chance of such dangerous and toxic compounds contaminating the product soup prepared in accordance with the claimed invention. Thus, the claimed compounds are a more environmentally friendly class of esterquats that are not manufactured using epichlorohydrin and which have no possibility of being contaminated thereby.

EP '261 gives direction to one of ordinary skill in the art on how to prepare an ester-containing quaternary ammonium compound and discloses in the reaction scheme on page 5 that the quaternary ammonium compound is formed by reacting a tertiary ammonium compound, a fatty acid and epichlorohydrin. EP '261 teaches that other compounds can be prepared using this reaction. In preparing such compounds EP'261 discloses that different tertiary ammonium compounds (by e.g. changing the length of the fatty acid group and/or by replacing the methyl group by ethyl groups) and/or different fatty acids ( $C_{15}$  instead of  $C_{17}$ ) can be employed (see on page 5 lines 19-26 for the resulting compounds). However, EP'261 clearly does not disclose or suggest that a substitute can be utilized instead of epichlorohydrin. Accordingly, applicants respectfully submit that absent hindsight reliance on applicants' disclosure, there is absolutely no motivation provided by EP'261 to employ a compound other than epichlorohydrin.

Additionally, even if, by chance, one of ordinary skill in the art chose to substitute a different compound for epichlorohydrin, what would he use? Would he/she use an alkyl, an alkylene, an aryl, which in turn may comprise functional groups such as hydroxyl or halide? Would he/she choose an alkyl group and if yes, which one; methyl, ethyl, propyl, etc., from which he would have to choose methyl. Then, if he/she did, by chance, choose a methyl substituent, he/she would have to choose the position of the methyl on the epichlorohydrin. One of ordinary skill in the art would have to make all of these choices...CORRECTLY...in order to arrive at the right substituted epichlorohydrin (i.e. 3-chloro-1,2-epoxybutane (see formula below)).



Applicants respectfully submit that EP'261 clearly fails to provide any motivation whatsoever to modify epichlorohydrin in order to arrive at this compound. Additionally, it is clear that one of ordinary skill in the art would be dissuaded from arriving at this compound for several reasons.

Firstly, the above-depicted compound is not readily available to a skilled person. This is illustrated e.g. by the absence of 3-chloro-1,2-epoxybutane in the Aldrich catalogue of 2003-2004.

Secondly, as previously indicated, the chloride in 3-chloro-1,2-epoxybutane is so sterically hindered that it is very unlikely that the chloride will react. More particularly, if the synthesis of EP '261 (page 5, lines 41-51) is considered for the preparation of the esterquat-formula II, the reagent, epichlorohydrin must be replaced by 3-chloro-1,2-epoxybutane (an epichlorohydrin having a methyl group rather than a hydrogen atom at the carbon bonded to the chlorine). In this reaction, the chlorine atom of epichlorohydrin is substituted by a stearyloxy-group and it is well known that this substitution takes place according to an  $S_N2$ -mechanism. The extra methyl group in 3-chloro-1,2-epoxybutane transforms the chlorine from a primary to a secondary chlorine atom. According to  $S_N2$ -reactions primary halides are much more reactive than secondary halides. In fact,  $S_N2$  reactions can occur only at relatively unhindered sites, and are normally useful **only with methyl halides, primary halides, and a few simple secondary halides**. The secondary halide 3-chloro-1,2-epoxybutane, which would be necessary for preparing the instant esterquats, is certainly not a 'simple secondary halide' in that the halide in 3-chloro-1,2-epoxybutane is considerably sterically hindered by both a methyl group and an epoxy-group, and an  $S_N2$  reaction would therefore virtually not occur. Hence, the formation of the esterquats of formula II is virtually impossible when using the method of EP '261, wherein epichlorohydrin is replaced by 3-chloro-1,2-epoxybutane, and, therefore, even if one of ordinary skill did choose this compound, he would not have had a reasonable expectation of success.



Finally, the Honorable Board is respectfully requested to note that the essence of the present invention is not found in some dramatic improvement in fabric softening properties, **but in the fact that these esterquats are a novel class of compounds in comparison with the esterquats of EP '261.** An advantage of this class of esterquats is that they **can be manufactured without utilizing epichlorohydrins, an environmentally dangerous compound that is difficult to handle and dispose of.** Further, there is no possibility of these dangerous reactants contaminating the products of the invention.

In summary, applicants respectfully submit that they have clearly demonstrated that EP'261 **does not disclose the claimed compounds** and that the claimed **compounds clearly cannot be made by the process of EP'261.** Additionally, since the claimed compounds can be made without using **epichlorohydrins, the use of an environmentally dangerous compound that is difficult to handle and dispose of is eliminated, and there is no possibility of this compound contaminating the resultant product mixture of the present invention.** In view of these substantial advantages, applicants respectfully submit that the claimed invention does represent a patentable departure from the teachings of EP'261.

## **X. CONCLUSION**

In view of the arguments presented herein Appellants respectfully submit that claims 1-10 and 12-14 stand improperly rejected. The Honorable Board is therefore respectfully requested to reverse the Examiner and pass all of the pending claims to issue.

Respectfully submitted,

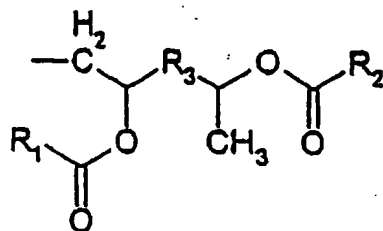
A handwritten signature in black ink, appearing to read "Ralph J. Mancini", written over a horizontal line.

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Attorney for Appellants  
Registration No. 34,054

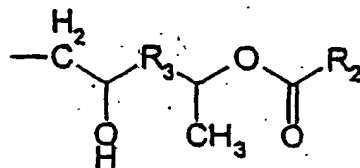
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## XI APPENDIX

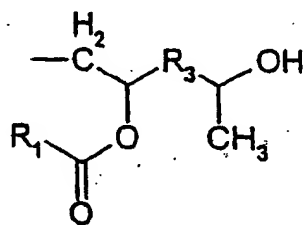
1. (previously presented) Quaternary ammonium compounds of the formula  $R_4[R_5R_6N^+Z]_n$   $X^-$  wherein Z is covalently bonded to the nitrogen atom and selected from the group of the following formulae (I-IV)



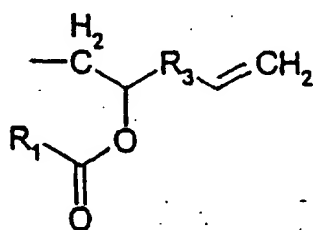
(I),



(II)

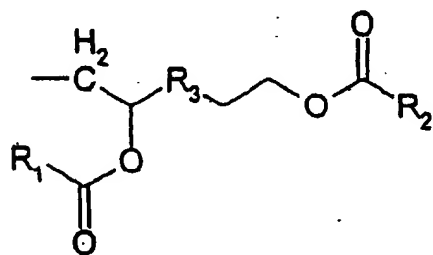


(III),

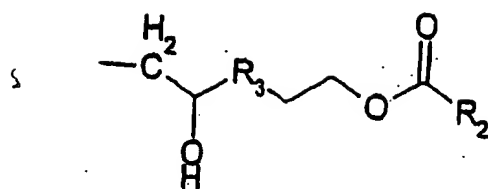


(IV),

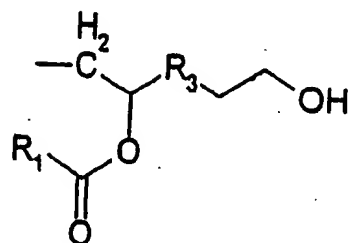
and the isomers thereof with the formulae:



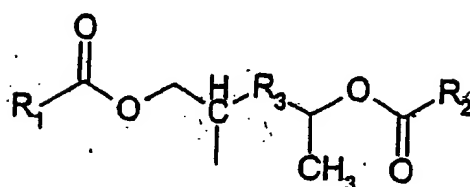
(Ia)



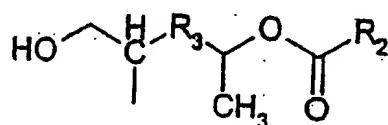
(IIa)



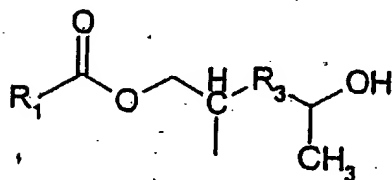
(IIIa)



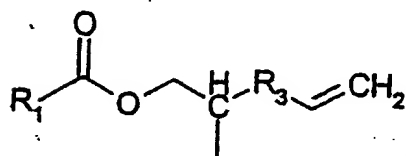
(Ib),



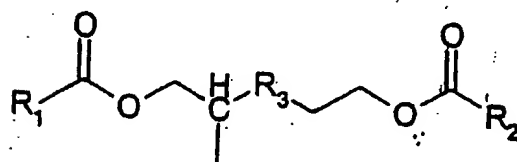
(IIb)



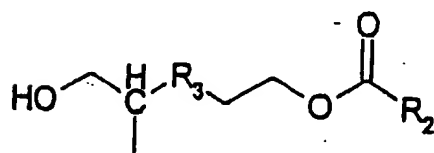
(IIIb)



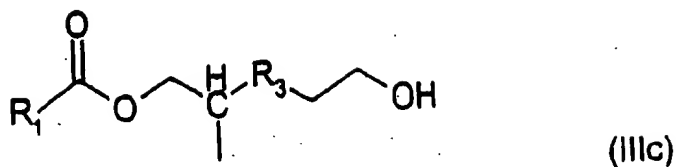
(IVb)



(Ic)



(IIc), and



wherein  $R_1$  and  $R_2$  are independently selected from linear or branched, saturated or unsaturated  $C_{8-22}$  hydrocarbyl,

$R_3$  is nothing or  $C_{1-20}$  hydrocarbyl,

$R_4$  is  $C_{1-6}$  alkyl,  $C_{1-6}$  alkylene, or independent Z,

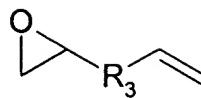
$R_5$  is H,  $C_{1-8}$  alkyl, independent Z, or the residue of the quaternizing agent, such as  $C_{1-30}$  alkyl or alkenyl, preferably  $C_{1-7}$  alkyl or alkenyl,

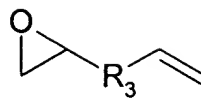
$R_6$  is  $C_{1-6}$  alkyl or independent Z,

n is 1 or 2, and

X is an ion selected from  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $F^-$ ,  $CH_3SO_4^-$ ,  $C_2H_5SO_4^-$ ,  $H_2PO_4^-$ ,  $HPO_4^{2-}$ , propionate<sup>-</sup>, tartrate<sup>-</sup>, and benzoate<sup>-</sup>, wherein the total charge of the anions equals the total charge of the cations.

4. (previously presented) Compounds according to claim 1 wherein  $R_1$  and  $R_2$  are independently selected from linear or branched, saturated or unsaturated  $C_{12-18}$  alkyl groups.
5. (previously presented) Compounds according to claim 1, wherein  $R_4$  and  $R_6$  are methyl.
6. (previously presented) Compounds according to claim 1 wherein  $X^-$  is chloride, methyl sulfate or ethyl sulfate.
8. (previously presented) A fabric softening composition comprising one or more of the compounds according to claim 1.
9. (previously presented) A process of making the compounds of claim 1 which comprises:



- reacting an unsaturated epoxide of the formula  with an amine or protonated amine of the formula  $R_4[R_5R_6N]_n$  or  $R_4[R_5R_6N^+H]_n X^-$ , wherein  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $n$ , and  $X^-$  have the meaning given in claim 1, and
- esterification of the intermediate with, on average, 1-2 moles of fatty acid derivatives, comprising the moieties  $R_1-C(O)-$ ,  $R_2-C(O)-$  or mixtures thereof, per mole of OH groups of the intermediate,
- an optional conventional quaternization either before or after said esterification step.

10. (previously presented) The process according to claim 9, wherein a trialkylamine is reacted with the unsaturated epoxide.

14. (previously presented) The composition of claim 8 which additionally comprises at least one performance booster selected from the group consisting of cationic and non-ionic surfactants.